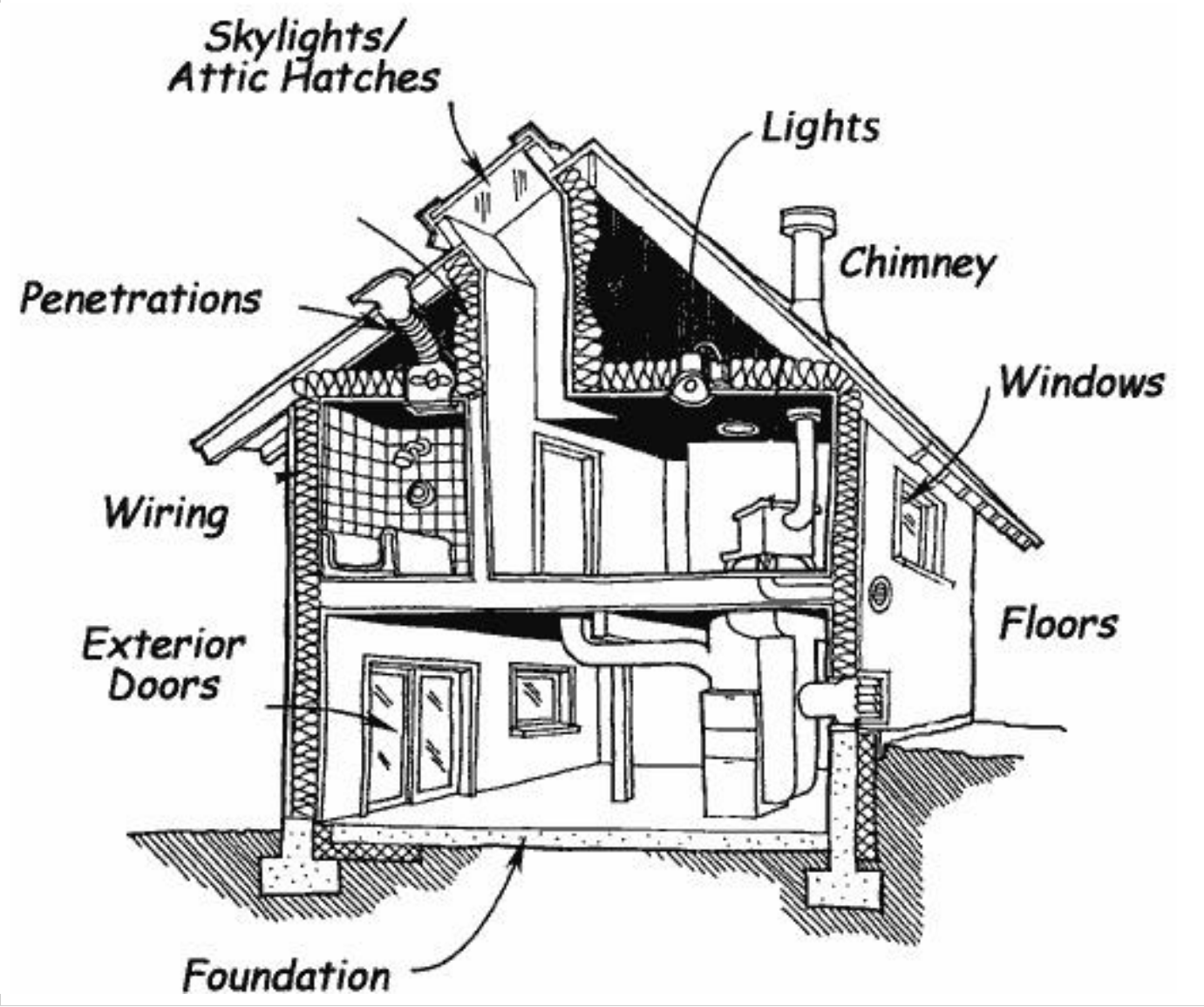
Areas for Air Leakage

[2003 IECC, 2006 IECC]



There are many areas for air leakage, including exterior doors, windows, floors, and foundations. In addition, places such as electrical boxes and plumbing fixtures can be areas for air leakage.

It is important to seal air leaks before insulating. Commonly used insulation materials, such as batt and loose-fill products, do not stop air leakage. As air leaks through these materials, it lowers the R-value. For most affordable home designs, materials other than insulation will form the air barrier. There are some insulation products, such as rigid foam sheathings and spray-in-place materials, that can reduce air leakage as well as insulate.

Most electrical boxes are inherently leaky even without wires penetrating the box. Care should be taken to caulk where the wires penetrate the box and to seal the unused "knock-outs" and other openings.

It is a common practice to use a drywall router to "trace" electrical boxes after the drywall has been installed. This often leaves sizeable gaps around the box, and significant air leakage will occur if the boxes are not properly sealed.

Completed electrical boxes should be caulked to the drywall.

Expanding foam is useful to fill holes left by installation of plumbing fixtures such as bathtubs.

Code Citations*

IECC 2003, Section 802.3.3 and IECC 2006, Section 502.4.3 Sealing the Building Envelope (Commercial)

Openings and penetrations in the building envelope shall be sealed with caulking materials or closed with gasketing systems compatible with the construction materials and location. Joints and seams shall be sealed in the same manner or taped or covered with a moisture-vapor-permeable wrapping material. Sealing materials spanning joints between construction materials shall allow for expansion and contraction of the construction material.

IECC 2003, Section 502.1.4.2 Caulking and Sealants (Residential)

Exterior joints, seams, or penetrations in the building envelope that are sources of air leakage shall be sealed with durable caulking materials, closed with gasketing systems, taped, or covered with moisture vapor-permeable housewrap. Sealing materials spanning joints between dissimilar construction materials shall allow for differential expansion and contraction of the construction materials.

This includes sealing around tubs and showers, at the attic and crawlspace panels, at recessed lights, and around all plumbing and electrical penetrations. These are openings located in the building envelope between conditioned space and unconditioned space or between the conditioned

space and the outside.

IECC 2006, Section 402.4.1 Building Thermal Envelope (Residential)

The building thermal envelope shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material:

1. All joints, seams and penetrations.
2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.
5. Dropped ceilings or chases adjacent to thermal envelope.
6. Knee walls.
7. Walls and ceilings separating a garage from conditioned spaces.
8. Behind tubs and showers on exterior walls.
9. Common walls between dwelling units.
10. Other sources of infiltration.

Additional Resource

- Does REScheck Take Air Infiltration into Consideration?

* 2003 IECC Reference and link

2003 International Energy Conservation Code ; 2006 IECC Reference and link

2006 International Energy Conservation Code